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W. R. HOPE.

APPARATUS FOR DRYING PULP BOARDS.

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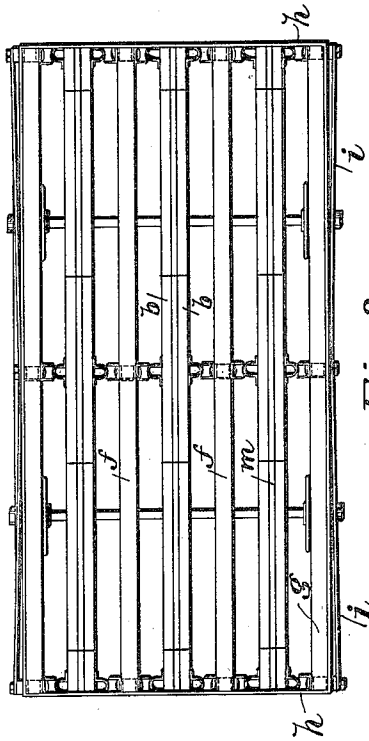


Fig. 3.

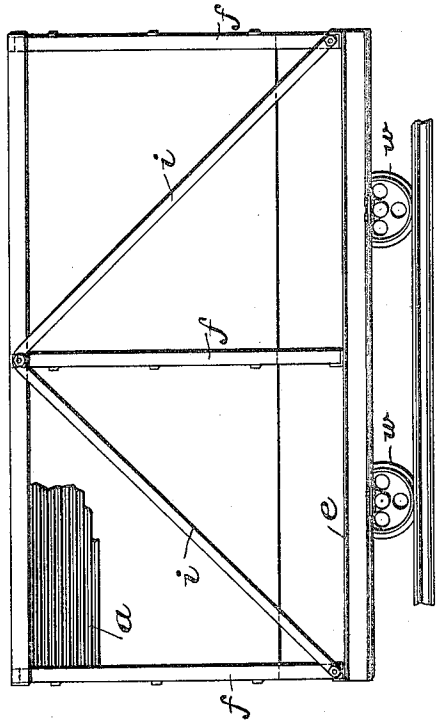


Fig. 2.

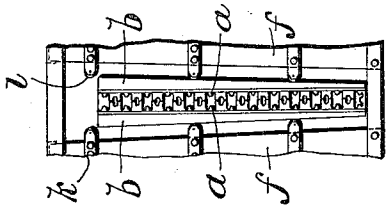


Fig. 4.

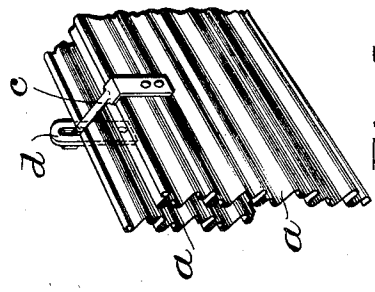


Fig. 5.

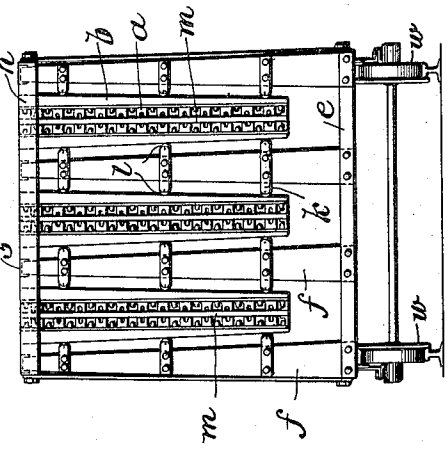


Fig. 1.

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UNITED STATES PATENT OFFICE.

WALTER R. HOPE, OF WILMINGTON, DELAWARE, ASSIGNOR TO THE E. I. DU PONT DE NEMOURS POWDER COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF NEW JERSEY.

APPARATUS FOR DRYING PULP BOARDS.

SPECIFICATION forming part of Letters Patent No. 793,374, dated June 27, 1905.

Application filed April 18, 1905. Serial No. 256,284.

To all whom it may concern:

Be it known that I, WALTER R. HOPE, a citizen of the United States, residing at Wilmington, in the county of Newcastle and State of Delaware, have invented a new and useful Improvement in Apparatus for Drying Pulp Boards, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The objects of my invention are to provide means whereby boards made of pulp, paper, or similar material may be easily handled during drying and will not warp during drying, so that when dry they will be uniform and straight.

In the drawings, Figure 1 is an end elevation of a car with drying-frame holding pulp boards in place. Fig. 2 is a side elevation of same. Fig. 3 is a plan view of same. Fig. 4 is a partial end elevation showing a pair of drying-frames with no pulp board between them in their lowest position, and Fig. 5 is a perspective view of a portion of a pair of frames and a device for clamping them together.

a a represent a holder or pair of frames between which the boards to be dried are held. These frames are shown as made of multiplex plate, although my invention is entirely independent of the particular style of frame that may be used. On the outer face of each frame is secured a plurality of vertically-extending tapered battens *b*, that decrease gradually in thickness from their upper to their lower ends, so that their outer faces are inclined inwardly toward the frames.

c d represent the two members of a clamping device secured, respectively, to the two frames of a pair, by means of which the frames of a pair may be held together and moved toward each other to clamp the pulp board between them. Any suitable clamping device may be employed.

e is the bottom frame of the car supported on the wheels *w*.

f represents stanchions or supports on the frame *e* and are held in position by means of the top frame *g*, top braces *h*, and inclined braces *i*. The stanchions are preferably tapered, so as to gradually increase in width from top to bottom.

k represents roller-frames secured to the stanchions *f*.

l represents rollers on the frames *k*. There are a plurality of rollers extending close to each stanchion into the open space between the stanchions. Preferably there are three or more rollers in each vertical set, and each roller except the highest projects beyond the roller above it, so that a plane touching the outer faces of a set of rollers would be inclined with an angle of inclination corresponding to that of the outer face of a batten *b* on the frame *a*.

When the board *m*, made of pulp, paper, or similar material, is taken from the forming-machine, it is in a moist and pliable state. This board is laid upon one of the holding-frames, and the other frame is placed upon the board and clamped to the first frame. The frames, with the board between them, are picked up and lowered down into the car, being placed in such position that the inclined outer faces of the battens *b* contact with the rollers *l* on the stanchions, as best illustrated in Fig. 1. The two stanchions between which the frames of a holder are placed form, with their rollers, a container presenting downwardly and inwardly inclined supporting-faces for the holder corresponding with the downward and inward inclination of the outer faces of the battens. The board is thus held in a vertical position for drying and a uniform pressure is put upon the board over its whole surface. When the car is filled, it is rolled into a dry-kiln, where the drying process takes place. By virtue of the shape of the frames practically the whole surface of the board is exposed to the drying action of the air. As the moisture is extracted from the board it will shrink. This allows the frames *a a* to come closer together and by gravity they will sink down between the rollers, whereby a constant pressure is maintained on the frames and on the board clamped

between them. Thus the board will be held from warping, so that when the drying operation is completed and the boards are removed from the frame they will be straight and uniform.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In an apparatus for drying pulp boards, the combination with a container presenting opposing faces converging from its receiving end for the reception of a holder, of a holder, adapted to be inserted between said supporting-faces, presenting on its opposite sides converging supporting-faces adapted to engage the supporting-faces of the container.

2. In an apparatus for drying pulp boards, the combination with a container having supporting members presenting opposing faces converging from its receiving end for the reception of a holder, of a holder consisting of two frames adapted to hold a pulp board between them, said frames having converging supporting-faces adapted to contact with and be supported by the supporting members of the container.

3. In an apparatus for drying pulp boards, the combination with a container having supporting members presenting opposing faces converging from its receiving end for the reception of a holder, of a holder consisting of two frames adapted to hold a pulp board between them, said frames having converging supporting-faces adapted to contact with and be supported by the supporting members of the container, and a clamping device for clamping the pulp board between the frames, adapted to permit the frames to approach each other while under pressure within the container.

4. In an apparatus for drying pulp boards, the combination, with a container having supporting members presenting opposing faces converging from its receiving end for the reception of a holder, of a holder consisting of two frames adapted to hold a pulp board between them, and battens on the outer faces of the frames having converging faces adapted to contact with and be supported by the supporting members of the container.

5. In an apparatus for drying pulp boards, the combination, with a container having supporting members presenting opposing faces converging from its receiving end for the reception of the holder, of a holder consisting of two frames adapted to hold a pulp board between them, battens on the outer faces of the frames having converging faces adapted to contact with and be supported by the supporting members of the container, and a clamping device for clamping the pulp to and between the frames, adapted to permit the frames to approach each other while under pressure within the container.

6. In an apparatus for drying pulp boards, the combination of roller-supports, vertical sets of rollers supported thereon, each roller of a set, except the highest, extending beyond the roller above it, the vertical sets of rollers of adjacent supports forming between them a container for the reception of a holder, and a holder presenting on its opposite sides converging supporting-faces adapted to be inserted between the opposing sets of rollers.

7. In an apparatus for drying pulp boards, the combination of roller-supports, vertical sets of rollers supported thereon, each roller of a set, except the highest, extending beyond the roller above it, and the vertical sets of rollers of adjacent supports forming between them a container for the reception of a holder, and a holder presenting on its opposite sides converging supporting-faces adapted respectively to contact with and be supported by opposing sets of rollers.

8. In an apparatus for drying pulp boards, the combination of roller-supports, vertical sets of rollers supported thereon, each roller of a set, except the highest, extending beyond the roller above it, and the vertical sets of rollers of adjacent supports forming between them a container for the reception of a holder, a holder consisting of two frames, adapted to hold a pulp board between them, and battens on the outer faces of the frames having converging faces adapted to contact with and be supported by opposing sets of rollers.

9. In an apparatus for drying pulp boards, the combination of roller-supports, vertical sets of rollers supported thereon, each roller of a set, except the highest, extending beyond the roller above it, and the vertical sets of rollers of adjacent supports forming between them a container for the reception of a holder, a holder consisting of two frames presenting on their outer sides converging supporting-faces adapted respectively to contact with and be supported by opposing sets of rollers, and a clamping device adapted to clamp the pulp board between the frames and permit the frames to approach each other while under pressure within the container.

10. In an apparatus for drying pulp boards, the combination of roller-supports, vertical sets of rollers supported thereon, each roller of a set, except the highest, extending beyond the roller above it, and the vertical sets of rollers of adjacent supports forming between them a container for the reception of a holder, a holder consisting of two frames adapted to hold a pulp board between them, battens on the outer faces of the frames having converging faces adapted to contact with and be supported by opposing sets of rollers, and a clamping device adapted to clamp said board between the frames while permitting the frames to approach each other while under pressure within the container.

11. In an apparatus for drying pulp boards,

the combination of the framework of a car, stanchions on said framework, wheels on which the framework is mounted, roller-frames secured to the stanchions, rollers on the roller-frames, frames for holding the pulp board, a clamp for each pair of holding-frames, tapered battens on the frames adapted to engage the rollers, the arrangement of the rollers being such as to form a wedge-shaped container for the reception of the holding-frames, whereby, as the board shrinks, the holding-frames will gradually move downwardly and maintain a constant and uniform pressure on the board.

In testimony of which invention I have hereunto set my hand, at Wilmington, Delaware, on this 10th day of April, 1905.

WALTER R. HOPE.

Witnesses:
C. M. MARKOE,
DAVID B. CURLETT.